

SAFE. SECURE. SUSTAINABLE.

Annual Report 2022/2023

Introduction by the Management Board

Dear Readers,

Maintaining our course despite rough waters – this was our motto to steer DEKRA through the global crises of 2022. And we were successful. Despite enormous challenges, we continued to grow.

We were able to leverage opportunities in the fields of future mobility, cyber security, and sustainability, and in our traditional core businesses such as vehicle inspection. In so doing, we benefited from our strong market positions, a consistent focus on our customers, and the continued digitalization of our services.

In 2022 the Management Board also focused on the implementation of Strategy 2025, which is aimed at making us a global partner for a safe, secure, and sustainable world by our centenary year of 2025.

With this in mind, we have anchored sustainability in our DNA in response to climate change. As an independent third party, we now ensure more than just safety and security – we also help our customers to achieve their sustainability objectives.

With regard to our own sustainability objectives, our second consecutive EcoVadis Platinum rating demonstrates that we are working successfully to become a carbon-neutral company by 2025. Join us on this journey!

Stan Zurkiewicz

Chairman of the Management Board DEKRA e.V.
and DEKRA SE
CEO

Petra Finke

Member of the Management Board DEKRA SE
(from 01.07.2023)
CDO

Peter Laursen

Member of the Management Board DEKRA SE
COO
Head of Region North-West Europe

Wolfgang Linsenmaier

Member of the Management Board DEKRA e.V.
and DEKRA SE
CFO
HR and Organizational Excellence



Go to the online report

<https://gb2023.dekra-online.de/en>

Supervisory Board

Dear Readers,

Russia's invasion not only brought great suffering to Ukraine in 2022, but also resulted in massive disruption to global supply chains, confronting the international community and the global economy with many challenges.

This situation also shaped the dialog between DEKRA SE's Supervisory and Management Boards. The agenda was expanded to include measures dictated by operational requirements alongside the ongoing implementation of Strategy 2025. The success of our collaboration was evident from the fact that DEKRA demonstrated resilience and fulfilled its growth potential.

As part of safeguarding the company's future the Supervisory Board also oversaw DEKRA's future strategic development. This included, for example, leveraging growth areas such as the emerging hydrogen economy. DEKRA is seeking to accelerate the transition to a hydrogen-based future through its commitment to greater investment in hydrogen infrastructure. Moreover, DEKRA is pushing to establish a legal framework for the safe introduction of hydrogen technologies. In the area of e-mobility, DEKRA already provides many compelling services, which are covered in more detail in the report.

Overall, 2022 was another challenging but ultimately successful year. On behalf of the Presidential and Supervisory Boards, I would therefore like to take this opportunity to thank all DEKRA employees for their contribution. I would also like to thank all the members of DEKRA e.V., as well as our customers and business partners, for their trust.

Stefan Kölbl

President of the Presidential Board of DEKRA e.V.
Chairman of the Supervisory Board of DEKRA SE

Highlights 2022

DECEMBER

JOINT VENTURE CERTIFAI

Audit and consulting firm PwC Germany, DEKRA, and the City of Hamburg's Innovation Starter Fund launch a company to test and certify artificial intelligence (AI) products.

NOVEMBER

ROAD SAFETY REPORT "MOBILITY OF YOUNG PEOPLE"

Entitled "Mobility of Young People," DEKRA's Road Safety Report 2022 highlights the benefits of feedback systems to the safety of this high-risk group. Vehicle feedback systems help to prevent risky driver behavior by monitoring driving style and providing feedback.

OCTOBER

HYDROGEN CONSUMPTION MEASUREMENT

BMW is relying on DEKRA's expertise ahead of the launch of the demonstration fleet of the iX5 Hydrogen. In the powertrain and emissions laboratory at the DEKRA Technology Center in Brandenburg, a prototype is used to measure consumption values.

SEPTEMBER

NEW PRESENCE IN COSTA RICA

The government of Costa Rica chooses DEKRA to operate the country's vehicle inspection program. As the global market leader, DEKRA now conducts vehicle inspections in 25 countries.

JULY

PARTNERSHIP WITH STARTUP HYLANE

DEKRA supports the first commercially operated rental fleet of hydrogen-powered commercial vehicles in Germany, forming a partnership with startup hylane. The subsidiary of insurance company DEVK specializes in providing a comprehensive range of hydrogen solutions to the logistics sector.

JUNE

INFORMATION SECURITY IN BRAZIL

DEKRA offers assessments in Brazil in accordance with the TISAX information security standard. This enables Brazilian supplier companies to participate in the recognized platform of the automotive industry. A cooperation with industry organization "Instituto da Qualidade Automotiva" (IQA) is helping to serve the Brazilian market in the most comprehensive manner.

MAY

PROCESS SAFETY IN THE FERTILIZER INDUSTRY

DEKRA introduces its Organizational Process Safety (OPS) method at a major fertilizer manufacturer with sites in Spain, France, and the United Kingdom. OPS identifies and reduces process-specific safety risks.

APRIL

ECOVADIS PLATINUM RATING CONFIRMED

EcoVadis, the leading international standard for sustainability in global value chains, awards DEKRA a platinum medal for the second time in succession. As a result, DEKRA is among the top one percent of the companies assessed.

FEBRUARY

HIGH-VOLTAGE TRAINING EXPANDED

The DEKRA Academy adjusts its diverse portfolio to satisfy the extended guidelines of the German Social Accident Insurance (DGUV). In particular, practical training has been increased. Anyone intending to train for the high-voltage sector in the future must ensure that the training course complies with DGUV requirements.

JANUARY

CLOUD-BASED ELEVATOR ANALYSIS

DEKRA launches LIFT Check, an app for the digital analysis of elevators developed in partnership with TK Elevator. Detailed measurements are made using a smartphone during just one ride in an elevator. The process is fast, easy, and compatible with all elevator models and manufacturers.

Regions

AMERICAS (1,510 EMPLOYEES)

The Americas region covers South, Central, and North America. As well as product testing, services such as exhaust gas testing and vehicle inspections are key business areas. In recent years, these services have been established or expanded in, for example, the USA, Brazil, Chile, Costa Rica and Mexico.

- › Vehicle Inspection
- › Audit
- › Digital & Product Solutions
- › Claims & Expertise
- › Industrial Inspection
- › Advisory & Training Services

NORTH-WEST EUROPE (3,494 EMPLOYEES)

DEKRA is expanding its vehicle inspection activities in the Scandinavian countries. In addition, the inspection of plants and power stations as well as digital services associated with the Industrial Internet of Things play an important role. The latter includes remote inspections and online monitoring services. Arnhem in the Netherlands is the central location for the company's diverse classic and innovative product testing and certification services.

- › Vehicle Inspection
- › Digital & Product Solutions
- › Advisory & Training Services
- › Audit
- › Claims & Expertise
- › Industrial Inspection

SOUTH-WEST EUROPE (7,794 EMPLOYEES)

In the South-West Europe region, which comprises France, Spain, Portugal, and Morocco, vehicle and industrial inspections are among the main DEKRA services. In France, DEKRA's second home market, the vehicle inspection network is characterized by the company's own stations and those operated by franchise holders.

At the site in Málaga, Spain, work focuses on the safe connectivity and electromagnetic compatibility (EMC) of cellphones, smart home products, and Industry 4.0 applications. There is also a test site for networked driving. The services at the site include product testing, the early-stage development of test processes, the testing of V2X (vehicle-to-everything) technologies, and big data applications.

- › Vehicle Inspection
- › Temp Work
- › Digital & Product Solutions
- › Advisory & Training Services
- › Audit
- › Claims & Expertise
- › Industrial Inspection

**GERMANY, SWITZERLAND & AUSTRIA
(25,001 EMPLOYEES)**

These three countries make up one of DEKRA's key regions, centered on its home market of Germany. Innovations are rolled out from Germany and future-defining issues such as hydrogen and cyber security are being addressed in each of these countries. For example, the DEKRA Technology Center at the Lausitzring in Klettwitz, Germany, is Europe's largest manufacturer-independent test track for automated and connected mobility.

- › Vehicle Inspection
- › Temp Work
- › Digital & Product Solutions
- › Advisory & Training Services
- › Audit
- › Claims & Expertise
- › Industrial Inspection

**CENTRAL-EAST EUROPE & MIDDLE EAST
(7,174 EMPLOYEES)**

The portfolio not only includes services for corporate customers, for example, in connection with electromagnetic compatibility. In response to the COVID-19 pandemic, DEKRA also introduced the Trusted Facility Certificate as a new standard for health and safety at tourist destinations.

- › Vehicle Inspection
- › Temp Work
- › Digital & Product Solutions
- › Advisory & Training Services
- › Audit
- › Claims & Expertise
- › Industrial Inspection

**APAC
(3,673 EMPLOYEES)**

The Asia-Pacific (APAC) region consists of Asian countries such as China, Japan, and South Korea, as well as Australia, New Zealand, and South Africa. Alongside vehicle and plant inspections, the business there focuses on product testing for the automotive, energy, and medical technology industries, as well as for the retail sector.

- › Vehicle Inspection
- › Temp Work
- › Digital & Product Solutions
- › Advisory & Training Services
- › Audit
- › Claims & Expertise
- › Industrial Inspection

Service Divisions

VEHICLE INSPECTION

Performing periodic and non-periodic technical testing, as well as systematic emission tests for all kinds of vehicles.

- › Non-Periodical Inspection Safety Inspection (could include emission)
- › Periodical Inspection Vehicle Emission Test only
- › Licensing Services
- › Franchise Services

CLAIMS & EXPERTISE

Delivering automotive and non-automotive claims services, vehicle appraisal and management services as well as loss adjusting for all possible damage.

- › Claims Handling
- › Loss Adjusting
- › Vehicle Appraisal Services
- › Vehicle Management Services

DIGITAL & PRODUCT SOLUTIONS

Innovating safety and security by creating the intelligent testing solutions that contribute to making the digitalized and connected world a safer place. We are the experts in testing and certifying products and new digital technologies.

- › Cyber Security Services
- › EMC & RF Testing
- › Product Certification
- › Automotive Testing
- › Artificial Intelligence & Advanced Analytics Services
- › Medical Device Certification
- › Product Safety Testing
- › Connectivity Testing
- › Big Data Services

INDUSTRIAL INSPECTION

Delivering automotive and non-automotive claims services, vehicle appraisal and management services as well as loss adjusting for all possible damage.

- › Advanced NDT
- › Buildings & Infrastructure Inspection
- › Calibration
- › Cranes Inspection
- › Destructive & Labs Testing
- › Electrical Inspection
- › Environmental Inspection & Ambient Conditions
- › Fire Protection – Design & Inspection
- › Lift Inspection
- › Machinery & Equipment Inspection
- › Mechanized Inspection
- › NDT
- › Plant Safety – Equipment & Plant Inspection
- › Pressure Equipment Inspection
- › Safety Installations & Ventilation Systems
- › Welding Services

ADVISORY & TRAINING SERVICES

Qualified employees and high-performing companies through competent advisory and training services using modern tools and digital technologies.

- › Health, Safety & Environment
- › Process Safety
- › Sustainability Advisory Training
- › Automotive Business Improvement
- › Transport & Logistics Training
- › Information Security
- › Management Systems Trainings
- › Personal & Professional Development
- › Publicly Funded Training

AUDIT

Offering independent audits, assessments and management system certifications according to international and national standards.

- › Management System Certification
- › Personnel Certification
- › Expert Audits & Assessments

TEMP WORK

Supporting know-how and experience in personnel-, solution-, event & logistic and human resources management.

- › Classic Temporary Work
- › Candidate Management
- › Human Resources Management Solutions
- › Event & Logistic Management

Strategy 2025

»DEKRA is the global partner for a safe, secure, and sustainable world.«

At DEKRA, we have been synonymous with safety for almost 100 years, always keeping our finger on the pulse and paying close attention to the needs of our customers. We understand that the digital networking of products and systems, as well as climate change, are changing and increasing the need for safety and security.

In recent years, the security of personal data and networked systems against external attack and sustainability have become important aspects alongside physical safety and integrity.

For DEKRA, future mobility, sustainability, and cyber security are among the most important strategic fields of action in the areas of digitalization and the transformation of the global economy. Interdisciplinary technologies, such as artificial intelligence and remote technologies, are growing in importance across all services.

We will be focusing our expertise on different target groups, addressing current challenges, and leveraging all the opportunities available for future growth.

Key figures

Here you can gain a rapid overview of DEKRA's key figures and other performance indicators.

Revenue		2020	2021	2022
Revenue DEKRA SE and regions				
Revenue DEKRA SE	in € million	3,188.2	3,534.8	3,796.5
of which Germany	in € million	1,929.6	2,145.7	2,358.5
of which Central East Europe & Middle East	in € million	146.9	166.2	170.7
of which North-West Europe	in € million	332.6	355.8	365.2
of which South-West Europe	in € million	497.9	551.1	544.3
of which Americas	in € million	93.4	94.8	113.5
of which APAC	in € million	187.8	221.2	244.3
Revenue DEKRA SE and business areas				
Revenue DEKRA SE	in € million	3,188.2	3,534.8	3,796.5
of which Vehicle Inspection	in € million	1,131.4	1,217.7	1,308.3
of which Claims & Expertise	in € million	484.5	483.4	514.6
of which Product Testing	in € million	259.3	296.3	317.8
of which Industrial Inspection	in € million	507.2	555.0	555.9
of which Advisory & Training Services	in € million	381.7	403.2	410.7
of which Audit	in € million	81.0	99.9	108.8
of which Temp Work	in € million	306.2	438.5	539.3
of which Other	in € million	36.9	40.8	41.1

Earnings		2020	2021	2022
DEKRA SE group				
Adjusted earnings before taxes (EBT)	in € million	183.8	215.5	210.5
Adjusted earnings before interest and taxes (EBIT)	in € million	195.9	226.0	226.4
Adjusted EBT margin	in %	6.1	6.4	6.0

Investment and cash flow		2020	2021	2022
DEKRA SE group				
Net investement in tangible assets (property, plant, and equipment) and intangible assets	in € million	89.6	100.6	133.1
Gross investement in tangible assets (property, plant, and equipment) and intangible assets	in € million	96.7	106.6	143.2
Cash flow from operating activities	in € million	413.1	367.4	286.3

Balance sheet		2020	2021	2022
DEKRA SE group				
Total assets	in € million	2,739.0	2,811.3	2,812.4
Non-current assets	in € million	1,775.3	1,839.8	1,848.5
Current assets	in € million	963.7	971.5	963.9
Equity	in € million	808.5	942.8	1,153.5
Equity ratio	in %	29.5	33.5	41.0

Employees		2020	2021	2022
excluding DEKRA e.V. and DEKRA Digital GmbH				
Number as of 31/12		43,990	47,770	48,646
Personnel expenses	in € million	2,101.4	2,327.3	2,550.3

Corporate Governance

MANAGEMENT BOARD

Stan Zurkiewicz

Chairman of the Management Board
DEKRA e.V. and DEKRA SE
CEO

Wolfgang Linsenmaier

Member of the Management Board
DEKRA e.V. and DEKRA SE
CFO
HR and Organizational Excellence

Petra Finke

Member of the Management Board DEKRA SE
(from 01.07.2023)
CDO

Peter Laursen

Member of the Management Board DEKRA SE
COO
Head of Region North-West Europe

REGIONS

Peter Laursen

COO and
Head of Region North-West Europe

Guido Kutschera

Executive Vice President
Region Germany, Switzerland & Austria

Toni Purcaro

Executive Vice President
Region Central-East Europe & Middle East

Nicolas Bouvier

Executive Vice President
Region South-West Europe

John Tesoro

Executive Vice President
Region Americas

Mike Walsh

Executive Vice President
Region APAC

SERVICE DIVISIONS

Christoph Nolte

Executive Vice President
Service Division Vehicle Inspection

Wim Ter Voert

Executive Vice President
Service Division Claims & Expertise

Fernando Hardasmal

Executive Vice President
Service Division Digital & Product Solutions

Joakim Wikeby

Executive Vice President
Service Division Industrial Inspection

Lothar Weihofen

Executive Vice President
Service Division Advisory & Training Services

Roman Zadrozny

Executive Vice President
Service Division Audit

Suzana Bernhard

Executive Vice President
Service Division Temp Work

CORPORATE FUNCTIONS**Mark Thomä**

Executive Vice President
Marketing & Sales, DEKRA Group

Holger Ewald

Executive Vice President/ Chief Information
Officer (CIO), Global Integrated IT, DEKRA Group

Guido Ruiz Höhn

Executive Vice President, Chief Human Resources
Officer (CHRO), DEKRA Group

Christian Köhn

Executive Vice President, Legal, Compliance &
Data Protection, DEKRA Group

Uta Leitner

Executive Vice President, Communications &
Brand Management, DEKRA Group

PRESIDENT'S LEGAL ENTITIES**Jann Fehlauer**

Executive Vice President
DEKRA Automobil GmbH Germany

Friedemann Bausch

Executive Vice President
DEKRA Automobil GmbH Germany

Committees

DEKRA E.V.

PRESIDENTIAL BOARD DEKRA e.V.

Stefan Kölbl	President, Leinfelden-Echterdingen <small>[since 06.04.2022]</small>
Thomas Pleines	President, Munich <small>[until 06.04.2022]</small>
Dipl.-Wirtsch.-Ing. Arndt G. Kirchhoff	Vice President, Attendorn
Prof. Thomas Edig	Zwickau
Klaus-Jürgen Heitmann	Coburg
Bernhard Mattes	Köln
Dr. Harald Schwager	Speyer
Dr. Stefan Sommer	Meersburg
Dipl.-Ing. Bernd Tönjes	Marl
Dipl.-Wirtsch.-Ing. Peter Tyroller	Stuttgart
Prof. Dr. Wolfgang Weiler	Coburg

EXECUTIVE BOARD DEKRA e.V.

Stan Zurkiewicz	Chairman, Stuttgart <small>[since 06.04.2022]</small>
Stefan Kölbl	Chairman, Leinfelden-Echterdingen <small>[until 06.04.2022]</small>
Wolfgang Linsenmaier	Freiberg am Neckar

ADVISORY BOARD DEKRA e.V.

Matthias Wissmann	Chairman, Ludwigsburg
Stefan Kölbl	Vice Chairman, Leinfelden-Echterdingen <small>[since 06.04.2022]</small>
Thomas Pleines	Vice Chairman, Munich <small>[until 06.04.2022]</small>
Univ.-Prof. Dr.-Ing. Thomas Bauernhansl	Pforzheim
Staatssekretär a. D. Dr. h. c. Rudolf Böhmler	Schwäbisch Gmünd
Ulrich Dietz	Stuttgart
Jürgen Karpinski	Frankfurt a. M.
Mathias Krage	Hannover
Simone Menne	Kiel
Hildegard Müller	Düsseldorf
Joachim Müller	München
Prof. Dr.-Ing. habil. Markus Oeser	Stolberg <small>[since 16.03.2022]</small>
Dipl.-Wirtsch.-Ing. Andreas Renschler	Stuttgart
Prof. Dr. Hermann Requardt	Erlangen
Prof. Dr. Thomas Weber	Stuttgart

Committees

DEKRA SE

SUPERVISORY BOARD

Stefan Kölbl	Chairman, Leinfelden-Echterdingen <small>[since 06.04.2022]</small>
Thomas Pleines	Chairman, Munich <small>[until 06.04.2022]</small>
Monika Roth-Lehnen	Vice Chairman, Wuppertal <small>[Employee Representative]</small>
Ulrich Beiderwieden	Berlin <small>[Employee Representative, until 06.04.2022]</small>
Frank Beimborn	Ennepetal <small>[Employee Representative, until 24.03.2022]</small>
Hanna Binder	Stuttgart <small>[Employee Representative, since 06.04.2022]</small>
Prof. Dr. Sabine Fließ	Möhnese
Nicolas Gibaudan	Suzette, France <small>[Employee Representative, since 06.04.2022]</small>
Klaus-Jürgen Heitmann	Coburg
Jean-Luc Inderbitzin	Doulevant-le-Château, France <small>[Employee Representative]</small>
Dipl.-Ing. (FH) Wilfried Kettner	Dermbach <small>[Employee Representative, until 06.04.2022]</small>
Dipl.-Wirtsch.-Ing. Arndt G. Kirchhoff	Attendorn
Dipl.-Ing. (FH) Stephan Kramer	Henstedt-Ulzburg
Daniel Kusch	Cologne <small>[Employee Representative, since 24.03.2022]</small>
Jörg Leiser	Ettlingen <small>[Employee Representative, since 06.04.2022]</small>
Laurent Masquet	Saint-Sulpice-et-Cameyrac, France <small>[Employee Representative, until 06.04.2022]</small>
Dipl.-Wirtsch.-Ing. Peter Tyroller	Stuttgart

MANAGEMENT BOARD DEKRA SE

Stan Zurkiewicz	Chairman, Stuttgart <small>[since 06.04.2022]</small>
Stefan Kölbl	Chairman, Leinfelden-Echterdingen <small>[until 06.04.2022]</small>
Ulrike Hetzel	Renningen <small>[until 31.12.2022]</small>
Wolfgang Linsenmaier	Freiberg am Neckar
Peter Laursen	DK-Allerød <small>[since 05.04.2023]</small>
Petra Finke	Emsdetten <small>[from 01.07.2023]</small>

Future Mobility

Sustainable and Safe Drive Technologies

At the start of 2023, the EU became the first region to decide that, from 2035, the only vehicles with combustion engines it will still approve will be those that run only on carbon-neutral synthetic fuels (e-fuels). The future will be reserved for sustainable drive technologies, and DEKRA is helping to shape the safety and security of this future.

TEST CENTER FOR BATTERIES

The demand for testing services for high-performance battery modules and packs has increased sharply and is set to continue growing. DEKRA is therefore setting up a test center for automotive and stationary battery systems at its Technology Center at the Lausitzring in Klettwitz, Brandenburg. Following millions of euros of investment, it is set to commence operations at the end of 2024.

The new test center will combine all types of battery tests under one roof. As well as mechanical inspections, these tests will include performance, environmental, and misuse tests. All of the services will be offered alongside the development process and also as part of homologation, certification, quality assurance, and market surveillance.

The increasing demand for battery testing is directly linked to the upcoming ban on the sale of new combustion engine vehicles from 2035, and to the strategy adopted by many manufacturers to convert their models to electric drives before this date.

LAUSITZRING SITE PROFILE

DEKRA took over the Lausitzring on November 1, 2017. Since then, it has transformed the site from a racetrack with a test center into a test center with racetrack. Today, in combination with the neighboring DEKRA Technology Center, which opened in 2003, the site forms Europe's largest manufacturer-independent testing center for tomorrow's automated and connected mobility.

INVESTMENTS

- › Multifunctional area in the paddock
- › Noise measurement track
- › Functional and office building
- › Platforms and targets for swarm tests on vehicles with automated functions
- › Wi-Fi and 5G networks for controlling tests
- › Laboratories at the DEKRA Technology Center
- › Powertrain and exhaust emissions laboratory for testing electric and hydrogen-powered vehicles
- › Expansion of Test Oval with overland and city courses

EXPERTISE IN E-MOBILITY

Critical to the success of e-mobility is the ability to charge a vehicle at any charging station without any problems. Commissioned by the California Energy Commission, DEKRA set up the Vehicle-Grid Innovation Lab (ViGIL), which offers testing and certification services with respect to the interoperability of charging technologies. The tests are necessary for enabling access to national and state-level subsidies.

DEKRA has introduced a new Open Area Test Site at its site in Arnhem, Netherlands, for measuring electromagnetic compatibility (EMC). This allows vehicles that are too large for converted EMC chambers to be tested; for example, electric buses and e-trucks.

Since summer 2022, the new test bench for electric motors and electric drive axles has been in operation at the Technology Center in Klettwitz. The powertrain and exhaust emissions laboratory there has been designed to test battery and hydrogen-powered vehicles

Three questions for ...

Erik Pellmann

Head of DEKRA Technology Center,
Klettwitz (Brandenburg)

Erik Pellmann has been the specialist division head in charge of the DEKRA Technology Center at the Klettwitz site in Brandenburg since January 1, 2023. Before that, he was Head of Powertrain and Exhaust Emissions there. With a degree in automotive engineering, the official expert for commercial vehicles and qualified vehicle mechanic began his career at DEKRA in 2007, as a specialist in powertrain and exhaust emissions at the DEKRA Technology Center.

WHAT NEW DEMANDS IS E-MOBILITY PLACING ON DEKRA?

For e-mobility, we need a different set of competencies than those required for combustion engines. That is why, among other things, we are systematically restructuring our powertrain and exhaust emissions laboratory so that our services cater for the new drive types. The new test bench for electric motors and e-axles is another important element in this respect.

CAN YOU NAME ANY OTHER ELEMENTS?

We have designed our roller testing systems to test the range of electric vehicles and hydrogen consumption in fuel cell vehicles, in addition to the usual fuel consumption and emissions in combustion engine vehicles. At the Klettwitz site there will also soon be a test center for drive batteries. Here we have a state-of-the-art competence center for e-mobility, among other things, which enables us to support DEKRA's core automotive business around the world.

LOOKING SPECIFICALLY AT DEKRA'S CORE BUSINESS, VEHICLE INSPECTIONS ALSO NEED TO BE REDESIGNED TO CATER FOR E-MOBILITY. WHAT IS DEKRA DOING IN THIS RESPECT?

We are working hard on developing standards and test methods so that any potential risks associated with this new technology are considered and addressed in future general inspections. DEKRA is involved by way of its own research projects and is contributing its expertise and

resources to these developments via its participation in the respective committees. In the end, it will be the regulators – at an increasingly international level – who will decide on the design of these inspections. However, DEKRA is determined to play an important role here.

VOLTA TRUCKS: DESIGNED FOR ELECTRIC, DESIGNED FOR SAFETY

With its expertise in e-mobility DEKRA supports companies like Volta Trucks in the transition to zero-tailpipe-emission transportation. Volta Trucks was founded in 2019 and, in early 2023, announced the first production orders of over 300 units for its all-electric Volta Zero, specifically designed for last-mile urban distribution.

In 2022, DEKRA tested the Volta Zero at its laboratories in Klettwitz, Germany, and Arnhem, Netherlands. Both labs are experts in their fields: Arnhem focuses on e-mobility and charging infrastructure testing, whereas Klettwitz sets its focus on safety testing as well as connected and automated driving.

In Arnhem, the charging performance tests of the trucks were performed in conjunction with testing the battery management system by charging the vehicle at extreme temperatures from -20 degrees Celsius up to 40 degrees Celsius. For interoperability testing, different test scenarios were applied to monitor truck behavior during the charging process. In Klettwitz, the tests focused on validating the electrical design system of the Volta Zero. Among other things, DEKRA's experts tested the wiring system with regards to the cable cross-sections, the fuse concept, the interfaces/plug connections, and the design of the ground points. For this purpose, the individual strands to each consumer were loaded with current and voltage up to the limits. The tests were carried out on the entire vehicle and on a separate complete cable harness. Furthermore, passive safety tests were conducted to protect the driver in the event of an accident.

"We chose to partner with DEKRA because of the state-of-the-art equipment at the facilities and the very skilled engineers that are supporting us," says Georgios Krikis, High Voltage Battery Engineer at Volta Trucks.

Based on its claim “designed for electric, designed for safety”, Volta Trucks’ vision is to be the leader in zero-tailpipe-emission transport, reducing the effects of global warming and making our cities safer, healthier, and more pleasant for everyone. As a global partner for a safe, secure, and sustainable world, DEKRA is proud to support this mission.

SUMMARY – AROUND 100 YEARS OF EXPERTISE IN COMMERCIAL VEHICLE TESTING

On the basis of its expertise, DEKRA is in an excellent position to develop solutions for safe, secure, and sustainable mobility. The current focus is on battery and hydrogen-based drive technologies as well as safe and secure networked and automated driving. For this purpose, DEKRA has set up a global laboratory network with locations in China, America, and Europe. The labs in Europe comprise the three outstanding sites at Arnhem, Netherlands, Málaga, Spain, and Klettwitz, Germany, which is home to the DEKRA Technology Center and Europe’s largest independent test center for networked and automated driving. DEKRA is continuing to invest heavily in future mobility at all sites. The Klettwitz site with the Lausitzring has a particularly important function on this journey into the future.

Fast battery test

How healthy is the drive battery?

The value of a used electric vehicle depends largely on the condition of the drive battery.

DEKRA has therefore developed a patented fast battery test, which was rolled out in Germany, Benelux, and Scandinavia in 2022. Fifteen minutes is all it takes to produce a reliable assessment of the drive battery's state of health.

IN BRIEF – FAST BATTERY TEST

In contrast to other methods, a very short test drive of around 100 meters is already enough for the DEKRA fast battery test. The onboard diagnostic interface reads out the battery key data, which are then analyzed by means of algorithms, artificial intelligence, and an extensive model database. After this parameterization, DEKRA software evaluates the measured values. The process was validated by RWTH Aachen University and is protected by international patent.

Microchips tested

Safe autonomous driving

As was the case with e-mobility, Chinese companies are also pioneers when it comes to another important area for the future: autonomous driving.

Among the innovators is Black Sesame Technologies, headquartered in Shanghai. The company has set itself the highest standards of functional safety in the development of its microchips. DEKRA has awarded the company – as the world's first supplier of automotive-grade computer chips for autonomous driving – the ISO 26262:2018 ASIL Functional Safety Process Certificate.

„The ISO 26262 standard is the leading international standard for functional safety in the automotive industry, and is thus a prerequisite for operating in the future market of autonomous driving.“

Dr. Kilian Aviles, Senior Vice President of DEKRA APAC and Managing Director of DEKRA China.

The standard covers functional safety requirements throughout the entire product life cycle. Black Sesame Technologies worked closely with DEKRA for almost a year on the design of the necessary functional safety management system (FSMS). This included compiling around 100 special documents, such as operating policies and review and audit checklists.

“Through combination with an FSMS and the corresponding development processes in compliance with ISO 26262, the risks and systematic errors identified during the product development stage can be managed effectively and the functional safety requirements fulfilled in order to ensure that the products are safe and reliable,” says Gerhard Rieger, Senior Vice President Global Functional Safety, DEKRA SE.

Gerhard M. Rieger

Senior Vice President Global Functional Safety, DEKRA SE

Gerhard M. Rieger is responsible for functional safety and the international standard Automotive Software Process Improvement Capability Determination (ASPICE) at DEKRA DIGITAL. He also conducts training on ISO 26262, IEC 61508, and EN 5012x and developed the DEKRA personnel certification program “Professional Functional Safety Engineer/Manager” for the automotive, semiconductor, railway, and process industries. Gerhard M. Rieger has written several specialist articles and is the author of the book “Funktionale Sicherheit nach ISO26262” (Functional Safety According to ISO26262).

Dr. Kilian Aviles

Senior Vice President of DEKRA APAC and Managing Director of DEKRA China.

Dr. Kilian Aviles joined DEKRA in 2015 and has since held several key positions in Asia, including Regional Head of Strategy & Head of Product Testing and Managing Director of Taiwan and Automotive & Hightech Testing Business. He is now Managing Director of DEKRA Mainland China and Hong Kong.

Cyber Security

Building Resilience

Cyber attacks are a growing threat. Current figures from Check Point Research (CPR) show that in 2022 the number of attacks in Germany rose by 27 percent. Worldwide, companies recorded an average of 1,200 attacks each week in the fourth quarter of 2022.

These attacks targeted not only companies, but also governments, administrative bodies, and consumers. Through its Cyber Security Hub (CS Hub), DEKRA is taking a holistic, 360-degree approach to cyber security.

CYBER SECURITY HUB

DEKRA's CS Hub helps people, products, and organizations become more resilient to the risks posed by the internet. Its core competencies include functional safety and product testing. The automotive sector is a particular focus for the CS Hub because cars already have a high degree of connectivity, which means there is a considerable risk of cyber attacks that could endanger human lives.

To help the automotive sector become more resilient, the CS Hub tests and certifies in accordance with international cyber security regulations and standards. The "Global Cyber Security Outlook 2023" published at the World Economic Forum in Davos confirms that 29 percent of company directors are in favor of bringing in stricter regulations for cyber resilience.

For automotive manufacturers, certification in accordance with UNECE Regulations R155 and R156 is of enormous significance for type approval. It verifies that a vehicle has a functional cyber security management system (R155) and a software update management system (R156). In addition to technical inspections, cyber security training for CS Hub customers plays a key role in increasing employee resilience.

Three questions for ...

Andy Schweiger

Senior Vice President Global Cyber Security Services DEKRA

As SVP Cyber Security Services, Andy Schweiger is actively driving and supporting the implementation of the Group's strategic goals as well as all transformation initiatives around cyber security. Within his role he also owns the global responsibility for cyber security including the DEKRA Cyber Security Hub.

Andy brings 25 years of experience in innovation and digital transformation and +5 years in the TIC industry where he has held different positions in consultation and top management. He has broad experience in scaling and strategically developing cyber security services business and cross-industry development of digital products and services. Andy has an academic background in Business Administration and Business Engineering.

WHAT ARE THE GREATEST CHALLENGES IN THE IMPLEMENTATION OF CYBER SECURITY?

The battles between the attackers and defenders in the cyber security war are becoming increasingly intense. Although hardware and software solutions are growing in complexity, the security deficits in systems are also increasing, and cyber attacks are more sophisticated than ever before. To give an example: These days, a car may have around one million strings of software source code – and this number is increasing. As a rule of thumb, this could result in around 150,000 bugs, of which 10 percent could be used for cyber attacks, i.e., 15,000 potential gateways for hackers!

HOW IS DEKRA'S CYBER SECURITY HUB HELPING TO MAKE THE WORLD SAFER FROM CYBER ATTACKS?

Our work is making an important contribution to the review of cyber security standards and regulations that, for one thing, are used to inform legislation. With our neutral testing expertise, we help our customers prophylactically identify vulnerabilities in the very early stages of developing their products or services. These risks are often overlooked and could have disastrous consequences in the event of a cyber attack.

CYBER SECURITY IS A VERY DYNAMIC FIELD. HOW DO YOU ADAPT TO THE NEW STRATEGIES USED BY ATTACKERS?

The crucial factor here is the exchange of knowledge within our Cyber Security Hub and between cyber security experts worldwide. Our aim is to build resilience against dubious subcultures in the far reaches of the internet. In concrete terms, we are relentlessly expanding our teams' expertise through professional development and dialog between different cyber security disciplines, through collaboration with universities, and through participation in specialist work groups. Moreover, the Cyber Security Hub operates as an interdisciplinary community in which the exchange of expertise across national borders, specialist disciplines, and cultural contexts takes place on a daily basis. Our vision is for us and our team to establish a central cyber security think tank with a pool of more than 300 experts who are passionate about building cyber resilience.

CYBER SECURITY IN PRACTICE: CLOSING THE REGULATORY GAP

The consequences of a cyber attack on the charging infrastructure for electric cars could be serious, but this is something that people have not yet fully understood. Such attacks range from a (wide-scale) power outage and dangerously elevated currents to the misuse of personal data and payment details. Should an attacker manage to gain access to a charging station, they could also potentially disable the entire charging network – a nightmare for any charging network operator or for the car driver who depends on charging being reliable and secure.

Charging infrastructure cyber security is still in its infancy. Although existing regulations cover individual aspects of cyber security, no specific standards have been established so far. This is something that the EU and the USA are currently working on. However, until they come into effect, some countries are using existing standards, such as ETSI EN 303 645, as a point of reference.

As a result, the manufacturers and operators of charging infrastructure are not yet obliged to have the cyber security of their products or networks tested. However, DEKRA has already made preparations by developing an extensive cyber security certification program that completes its portfolio of services for safe charging infrastructure.

It includes checking the infrastructure's interoperability, its compliance with national and international standards, and its electrical safety and electromagnetic compatibility. This end-to-end testing ensures safe communication between the electric vehicle, the charging station, and the charging point operator.

»We offer the largest testing scope and the most comprehensive accreditations in the sector and can therefore test any charging infrastructure from end to end.«

Vincent Roes, Head of Strategic Development and Vice-President Service Division Product Testing

The cyber security certification program meets the specific requirements of the electric vehicle charging infrastructure. It is based on recognized cyber security standards, supplemented by the knowledge of DEKRA's e-mobility experts. "Our program overcomes a regulatory security deficit and will be a bridge for our customers, so that new regulations can be implemented in the various regions," says Vincent Roes. The program was developed under the leadership of the Product Testing Service Division. Following its roll-out in Málaga, the service is now also being offered in the laboratory in Arnhem, Netherlands, which is the DEKRA competence center for charging infrastructure. The service is also set to be introduced at the labs in Asia and the USA.

E-MOBILITY – SECURE ENCRYPTION

The DEKRA certification stamp on a charging station tells the electric car driver that the device has successfully passed the cyber security certification program. This includes testing for vulnerabilities, for example, and means that user and charging process data are encrypted and stored safely, thus minimizing the potential for misuse.

SUMMARY – THE ACHILLES HEEL OF DIGITALIZATION

Each new level of digitalization shifts cyber security further into the spotlight. DEKRA's response to this has been to build expertise and solutions in its dedicated CS Hub. As a result, the company has an excellent position in a market that is estimated to grow to as much as 250 billion euros by 2035.

Cyber Security in practice

App mania – playing it safe

The popularity of mobile applications (apps) is unwavering. Statistics show that, at the start of 2023, around 2.68 million apps were available in the Google Play Store.

However, these millions of apps also mean countless potential risks – especially when security has not been thoroughly tested. To ensure that apps are tested properly and application data are protected, the Google-initiated App Defense Alliance (ADA) has introduced a security check: the Mobile Application Security Assessment (MASA).

Developers benefit from testing their applications according to the MASA process, as it builds trust with the user if the app has been tested thoroughly in terms of security and data protection. There are just five providers that are authorized by the ADA to conduct these tests, and DEKRA is one of them.

DEKRA maintains close dialog with developers at all stages of the MASA process. In terms of data protection, for example, developers are required to clearly document how they collect and use personal data. If they resolve the vulnerabilities identified vulnerabilities and successfully pass the test, they receive an official security certification stamp.

APP SECURITY – SIX TEST CATEGORIES

- › Data storage and data protection
- › Cryptography
- › Authentication and session management
- › Network communication
- › Platform interaction
- › Code quality and build settings

Three questions for ...

Rubén Lirio Vera

Business Line Manager Cybersecurity Testing & Certification

As Business Line Manager, Rubén is actively shaping the Product Testing Portfolio within DEKRA's Cyber Security Hub and is also steering the onboarding of new cyber security solutions on a global level.

Rubén is an experienced professional and leader with a track record of over 15 years in the IT industry. He is an advocate for driving successful transformational initiatives within the organization and is known for building efficient teams that successfully bring new cybersecurity services to life.

His driven personality and his entrepreneurial background as a start-up founder, make him a respective member of different working groups, including the European Union Agency for Cybersecurity (ENISA), where he is contributing to enhancing future activities in the Cyber Security Market Analysis.

MORE AND MORE DEVELOPERS ARE HAVING THEIR APPS TESTED BY DEKRA. WHAT ARE THE MOST FREQUENT VULNERABILITIES?

Developers fail most frequently when it comes to authentication, session management, data storage, and data protection. This applies to around 40 percent of applications, and 90 percent fail in at least one test category. However, this is not really surprising because they are currently adapting their apps to proven security processes.

HOW DID DEKRA MANAGE TO BECOME ONE OF THE FIVE MASA PARTNERS?

Truth be told, it was a long process. For one thing, DEKRA had to pass a technical assessment in order to become qualified. And we also had to offer the service on the basis of a fully developed process that was accredited to ISO 17025. Furthermore, we had to ensure we met the requirements for quality and service level agreements. We were able to do this thanks to our qualified personnel and feedback from our customers.

WHAT ARE THE CURRENT TRENDS IN APP DEVELOPMENT AND WHAT DO THEY MEAN FOR SECURITY TESTING?

We are seeing more and more customers developing applications according to the security by design principle. As a result, certifying the apps is much easier because developers use proven processes from the design phase onward. Another important trend is the use of artificial intelligence and machine learning. These technologies enable apps to understand user behavior in order to deliver personalized experiences. This is something that MASA might be testing soon, to ensure that the apps comply with ethical principles. And lastly, cloud-based services are enabling greater flexibility, scalability, and security in the development of mobile applications.

Sustainability

Clear Commitment, Many Questions

What is my new laptop's carbon footprint? Can I rely on the battery in my electric car? How much does the business I work for focus on sustainability? Is a given product or service climate-neutral? As we move toward a sustainable future, our society finds itself grappling with questions like these.

Consumers want to be secure in the knowledge that their actions do not have a negative impact on our climate, that they do not adversely affect other people's lives, and that they can use new technologies with peace of mind. They want to be able to trust the companies that are engaged in this process of transformation. This requires a neutral third party that can ensure comparability, transparency, and reliable inspection processes while helping those involved to do the right thing.

WIDE RANGE OF SERVICES AROUND DOING BUSINESS SUSTAINABLY

DEKRA supports its customers on their path to becoming sustainable businesses. We offer more than 500 services spanning the key issues of the transition to clean energy, environmental, social, and governance (ESG), and building a circular economy. In doing so, we help organizations to focus, and deliver on the right priorities for themselves and their stakeholders, as well as to review and communicate what they have already achieved – in turn establishing trust.

A SAFE PATH TO SUSTAINABILITY

DEKRA takes the public's hopes for genuine sustainability seriously. Around a third of DEKRA's services are geared toward the transition to clean energy, ESG goals, and building a circular economy. "Our contribution toward a speedy and safe transformation comes in the form of our broad portfolio of services. As a result, we are one of the top providers of ESG assurance services and have been listed in the renowned Verdantix ESG Assurance Services Buyer's Guide," says Sebastian Bartels, Senior Vice President and Head of the Sustainability Services Corporate Focus Area.

DEKRA helps its customers with their strategic decisions and offers highly practical assistance with the product creation process – for instance, with testing, analysis, verification, and developing expertise.

As an independent third party, the organization also verifies the carbon footprint of consumer goods. These include computers made by global brands such as Lenovo. We inspect and certify new product groups in the electric vehicles sector, such as batteries, charging infrastructure, and the EVs themselves, and we provide the same services for products that generate renewable energy, such as photovoltaic modules and wind turbines. DEKRA is also supporting the development of infrastructure for the hydrogen economy. Sebastian Bartels sums up the strengths DEKRA has to offer as follows: "Our customers value our local, technical, and cross-sector experience coupled with our global view of the broad landscape of different sustainability considerations – from energy technologies, efficient methods, and processes to product sustainability and organizational sustainability."

SUMMARY – WEALTH OF EXPERTISE FOR SUSTAINABLE BUSINESS

From helping to establish a hydrogen economy and inspecting renewable energy facilities to certifying products intended for daily use, DEKRA brings its expert knowledge of safety and sustainability to many different areas. This makes it possible to align existing value chains with the decarbonized economy of the future.

Hydrogen

A key role to play in decarbonization

Hydrogen has the potential to play a crucial role in the decarbonization of industry and transportation, whether in the production of “green steel,” the operation of carbon-neutral trucks, buses, and cars, or over the long term in the decarbonization of travel by air and sea.

DEKRA assists its customers from the vehicle manufacturing industry in creating new products safely. For instance, DEKRA supported BMW in moving toward its limited production run of the iX5 Hydrogen, a fuel cell vehicle based on the X5. Testers at the DEKRA Technology Center, which is already equipped for the specific requirements of fuel cell vehicles, reliably compared the vehicle’s consumption levels with the manufacturer’s figures in the Worldwide Harmonized Light Vehicles Test Procedure (WLTP) driving cycle. The independent measurement by the DEKRA experts was an essential prerequisite before the limited run could start.

»The development of a safe and robust hydrogen infrastructure is essential for the successful decarbonization of industry and transportation.«

Dr. Christoph Flink, Hydrogen Economy Program Management at DEKRA

In a partnership with the German startup, hylane, DEKRA has also offered assistance with the first commercially operated rental fleet of hydrogen-powered goods vehicles in Germany. The DEKRA experts will be monitoring the vehicles at the rental customers’ premises throughout their life cycle – from initial handover to end of service.

DEKRA is also committed to a well-functioning hydrogen economy that extends beyond the products themselves. Currently, a key area for action in this regard is delivering the relevant infrastructure. “The development of a safe and robust hydrogen infrastructure is essential for the successful decarbonization of industry and transportation,” says Dr. Christoph Flink, who is responsible for hydrogen economy program management at DEKRA. The organization is making its expertise available to help advance the successful establishment of such infrastructure, working together with partners in the Hydrogen Europe association. “Today, DEKRA is one of the market leaders in safety testing for gas stations in Germany; we want people to feel just as safe at hydrogen refueling stations,” Dr. Flink explains..

Wind power

Top performance in extreme conditions

Similar to photovoltaic systems, wind power is a key technology for the transition to green energy. Wind turbines have to withstand extreme conditions – particularly when installed offshore – while, at the same time, operating safely and economically. Every outage or accident has a big financial impact.

DEKRA supports its customers throughout the lifetime of their wind turbines. For example, regular inspections and other mandatory checks are carried out during their working life. DEKRA is currently supporting various onshore wind farms as well as offshore projects such as Borkum Riffgrund 1 + 2 and Dan Tysk.

Three facts about safe wind power

Why is it becoming increasingly important to inspect turbines?

To meet the growing demand for renewable energy, it is essential for green electricity to be generated in a reliable manner. The safety of the facilities plays a crucial role here. In carrying out an inspection, DEKRA satisfies all the legal requirements, enabling a turbine or facility to be run safely.

What makes inspections so challenging – onshore and offshore?

Due to the specific hazards at play, the safety inspections on and around wind turbines require a high degree of expertise and a whole series of safety training programs. The weather conditions can sometimes be extreme, both onshore and especially offshore. If the wind speed and wave height exceed a certain threshold out at sea, it becomes impossible to work on turbines or reach them by boat.

What are the key factors in the safe operation of turbines?

Good care and upkeep. This depends crucially on adequate maintenance and the prompt repair of any faults – which, in turn, involves identifying even the slightest deviations from a turbine's target condition. This makes it possible for the operator to take timely and cost-effective corrective action.

Photovoltaics

Output and reliability in focus

Photovoltaic systems are an integral part of the transition to clean energy. In 2021, there was no better developed source of renewable energy generation. Experts expect output to increase from 286 GW in 2023 to 460 GW in 2030.

Already, 80 percent of the leading global manufacturers of solar modules make use of DEKRA's wide-ranging portfolio of services. In China, too, DEKRA is now doing even more to ensure that solar modules are made reliably and sustainably. In 2022, the organization set up its largest and most advanced solar laboratory to date, in Baoshan, Shanghai.

The new, 2,600-square-meter lab offers inspection and certification services along the entire solar value chain: from raw materials to components and modules right through to power facility operation and low-carbon certification.

»Thanks to our new laboratory, we can meet the Chinese solar industry's growing demand for high-quality inspection and certification services.«

Mike Walsh, Head of the APAC Region at DEKRA and Executive Vice President of the DEKRA Group

In establishing its Shanghai Renewable Energy Testing Center, DEKRA has underlined its commitment to the sustainable business practices of the future.

IMPRINT

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